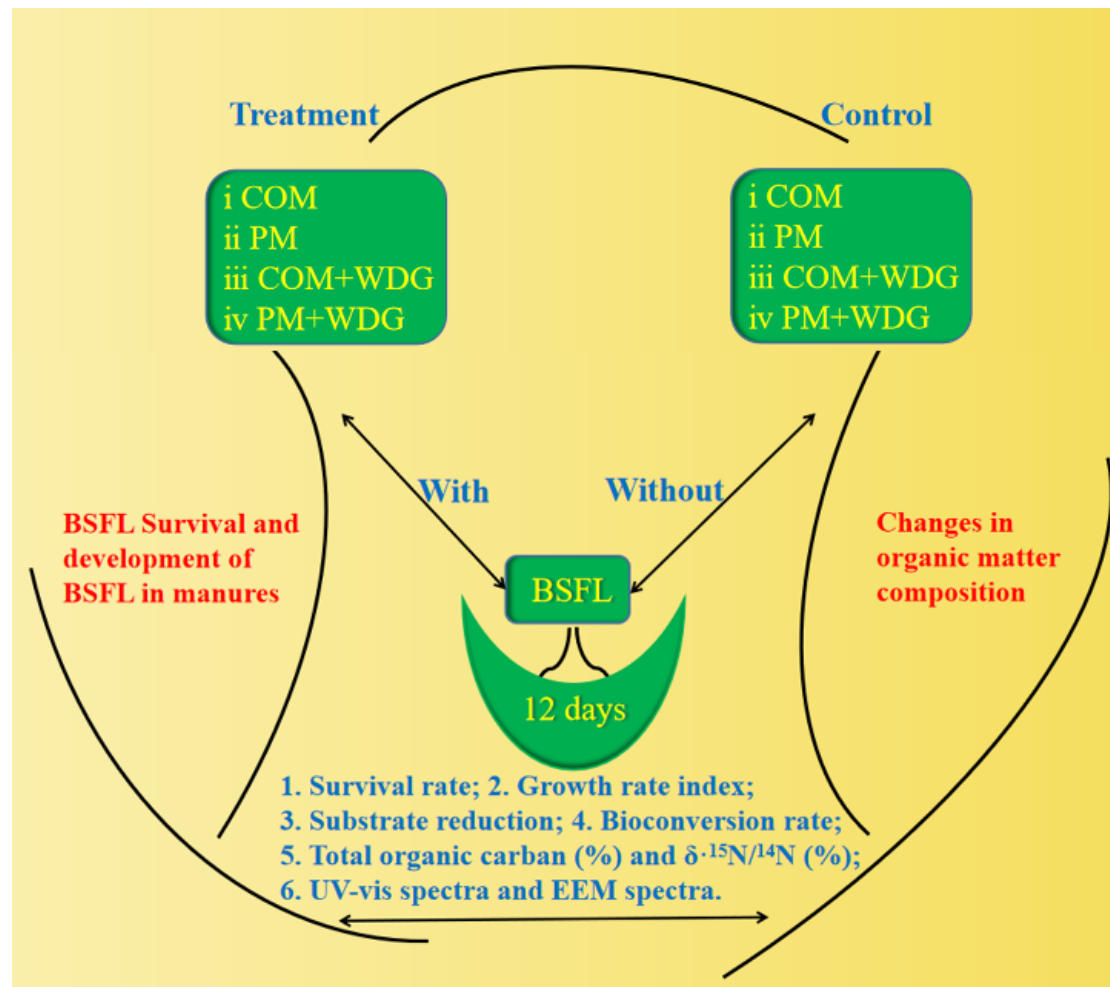


**Table S1.** Selected characteristics of raw materials in this study

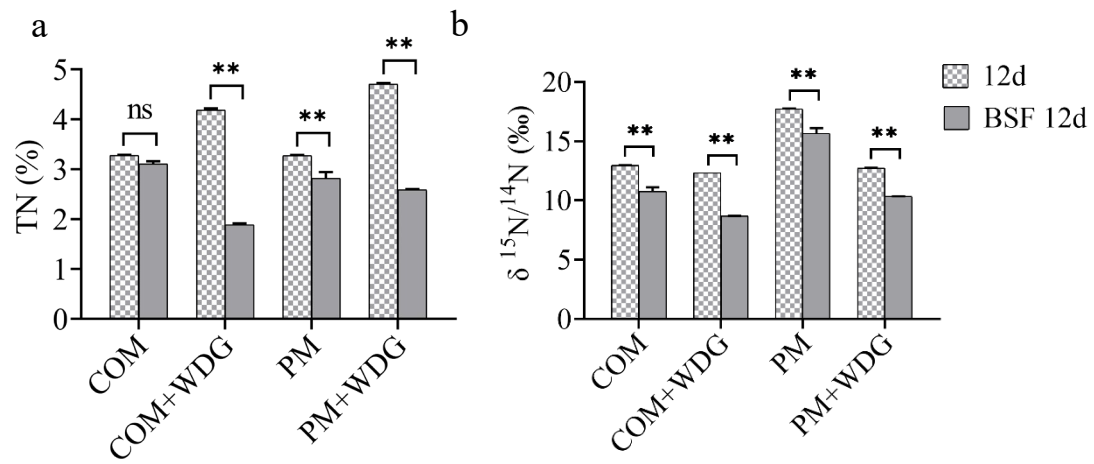
Parameters	COM	PM	WDG
pH	6.29±0.11	7.69±0.21	4.26±0.22
Total organic carbon (%)	3.27±0.06	3.35±0.07	1.72±0.09
Total Kjeldahl nitrogen (%)	43.17±0.12	44.48±0.09	46.11±0.06
C/N (%)	12.91±0.10	12.68±0.28	26.44±0.31
TOC (mg/L)	44.10±1.49	58.57±0.52	324.94±6.04
Total phosphorus content (µg/g)	13013±43.58	17487.49±27.63	2394.78±14.66
Al (µg/g)	6876.63±11.50	4324.48±9.79	214.33±6.07
Ca (µg/g)	27198.67±70.04	90227.00±103.55	812.98±10.58
Fe (µg/g)	4811.20±4.03	5822.01±19.27	0
K (µg/g)	26129.00±26.00	27909.67±25.58	1813.13±10.96
Mg (µg/g)	10228.33±13.65	12306.67±17.90	1147.20±15.40
Na (µg/g)	12389.33±558.21	12154.67±19.09	445.56±10.30
Cr (µg/g)	11.75±0.38	16.94±1.12	1.71±0.02
Mn (µg/g)	568.78±11.77	401.23±11.87	10.37±0.28
Co (µg/g)	2.17±0.05	2.38±0.01	0.05±0.01
Ni (µg/g)	4.73±0.16	7.04±0.02	0.75±0.03
Cu (µg/g)	34.25±2.32	188.63±6.03	3.65±0.02
Zn (µg/g)	222.93±10.20	536.04±5.73	34.48±0.12
As (µg/g)	17.22±0.34	18.19±0.19	14.76±0.30
Mo (µg/g)	2.54±0.13	2.93±0.03	1.05±0.05
Cd (µg/g)	0.54±0.02	0.55±0.01	0.24±0.17
Pb (µg/g)	6.26±0.09	6.59±0.06	0.97±0.02
Si (µg/g)	1150.65±45.06	683.31±5.38	119.72±0.74
Sr (µg/g)	171.55±5.52	226.99±4.14	6.06±0.02
Sb (µg/g)	0.57±0.02	0.70±0.01	0.93±0.03
Cs (µg/g)	0.83±0.03	0.97±0.01	0.02±0.00
Ba (µg/g)	138.26±4.20	62.85±2.58	2.84±0.01
Li (µg/g)	4.12±0.05	5.10±0.08	0.12±0.01
Be (µg/g)	0.22±0.03	0.26±0.02	0
V (µg/g)	9.94±0.10	7.65±0.03	0.16±0.01
Ga (µg/g)	2.30±0.07	1.74±0.02	0.05±0.00
Ge (µg/g)	1.22±0.04	0.74±0.02	0.02±0.00
Rb (µg/g)	36.18±2.18	45.14±2.48	1.58±0.02
Sr (µg/g)	125.58±6.20	245.02±4.41	4.11±0.01

Among all statistical tests, the IBM SPSS Statistics 26 (SPSS Inc., USA) software was used with one-way analysis of variance (ANOVA) to consider the BSFL bioconversion wastes as well as the question of excessive heavy metals in raw materials.

Supplementary S1: Experimental design of the study.



**Figure S1:** N-relevant harmful gas emission after manure treated by BSFL.



TN content (a) and  $\delta^{15}\text{N}/^{14}\text{N}$  ratio (b) of residual materials in pure and blended manures, \* $P < 0.05$ ; \*\* $P < 0.01$ .

**Table S2.** The phytotoxicity study of waste residues in rape.

Treatment	Relative germination percentage (%)	GI (%)
COM	100%	154.76±1.45b
COM+WDG	100%	123.64±1.12d
PM	100%	131.97±1.12c
PM+WDG	100%	164.46±1.80a

Average and standard deviation (n = 3) are displayed. Different letters indicate significant differences amongst different treatments ( $P < 0.05$ ).

**Table S3.** Micro nutrient composition of manure/compost produced by BSFL.

Sample	Major element							Trace element					
	TP	Ca	K	Mg	Na	Zn	Cu	Fe	Mn	Mo	Ni	Co	Cr
COM	14194.21±	23974.39±	29253.29±	12006.00±	11943.72±	229.96	37.45±	5250.74±	638.86	3.15±	20.74±	2.45±	46.80±
	198.23b	61.87c	137.47a	133.80a	105.35a	±5.23d	1.41b	52.63b	±5.74b	0.09b	0.84a	0.18a	1.02a
COM+	13047.95±	18417.98±	25282.33±	11633.01±	11302.07±	339.46	30.88±	4835.69±	451.24	2.63±	5.24±0	2.13±	12.07±
WDG	115.83d	105.98d	132.20b	112.55a	73.44b	±2.92c	1.47b	104.93c	±3.87c	0.20c	.21c	0.12a	0.08c
PM	16275.40±	83025.64±	22206.66±	12071.22±	10537.57±	419.91	173.63	6486.80±	406.97	3.65±	18.43±	2.42±	34.08±
	110.72a	74.94a	92.65c	106.43a	60.88c	±7.13a	±3.91a	86.94a	±3.04d	0.12a	0.22a	0.13a	0.63b
PM+W	13546.98±	52620.26±	13644.34±	5476.50±6	3089.24±4	371.61	20.09±	1309.45±	791.61	1.37±	5.45±0	0.51±	4.00±0
DG	155.09c	137.30b	135.01d	9.32b	4.32d	±6.48b	0.60c	72.06d	±1.39a	0.06d	.22c	0.02b	.16d

Average and standard deviation (n = 3) are displayed. Different letters indicate significant differences amongst different treatments ( $P < 0.05$ ).